INGENIERÍA MECATRÓNICA

DI_CERO

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RPA (ROBOTIC PROCESS AUTOMATION)

BLUEPRISM

Automatización RPA con Blueprism

Contenido

RPA: Robotic Process Automation

RPA se refiere a la utilización de Bots y VDIs para automatizar procesos operacionales y/o administrativos de una empresa creados con la plataforma de Blueprism, que no es de código libre, sino que utiliza una licencia.

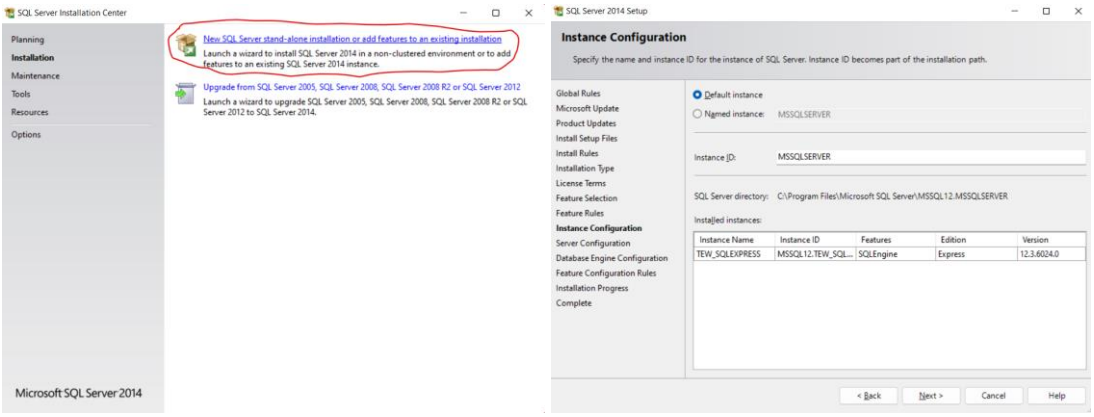
VDI: Virtual Desktop Infrastructure

El término VDI (Virtual Desktop Infrastructure) hace referencia al uso de máquinas virtuales para proporcionar y gestionar escritorios virtuales. La función de una VDI es alojar entornos de escritorio en un servidor centralizado y luego distribuirlos a usuarios según sus necesidades. En RPA cada proceso de automatización puede correr en una VDI distinta.

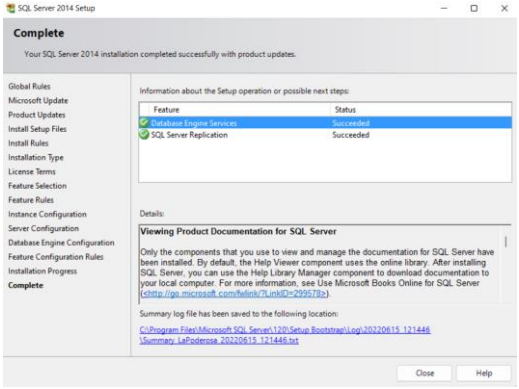
Instalación Blueprism

Blueprism es una plataforma de R.P.A. (Robot Process Automation), para poder utilizar Blueprism se debe:

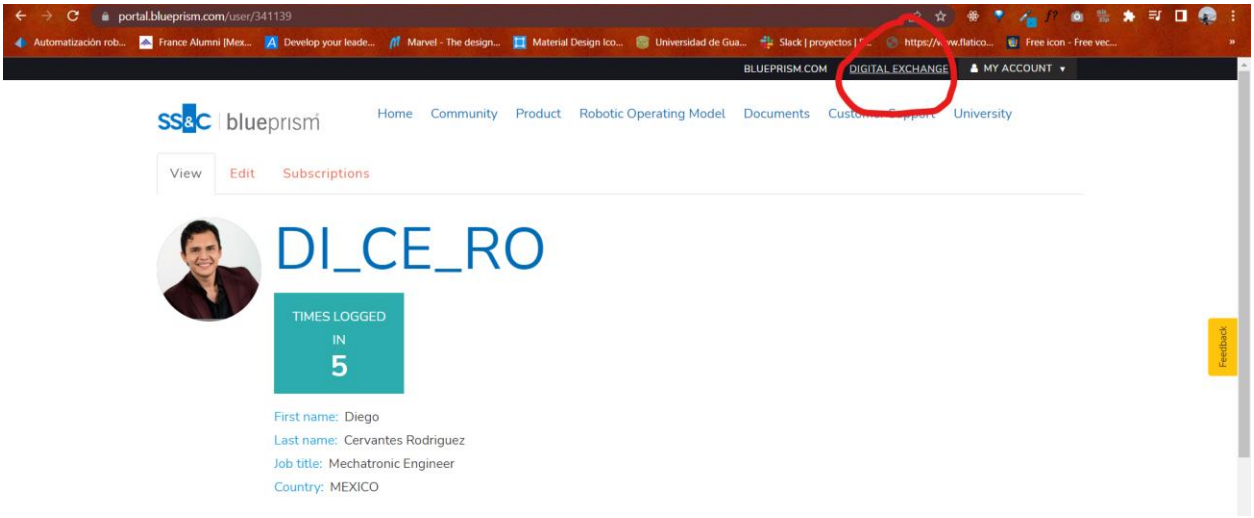
- Crear una cuenta de Blueprism para que se nos proporcione una licencia del software por correo:
  - https://portal.blueprism.com/
- Descargar una versión de Microsoft® SQL Server® 2014 Service Pack 2 (SP2) Express:
  - https://www.microsoft.com/en-US/download/details.aspx?id=53167
    - Cuando se realice esto, se debe crear una nueva instancia de un nuevo servidor SQL: Dar que sí a todo y aceptar la licencia hasta que aparezca la ventana de Instance Configuration.

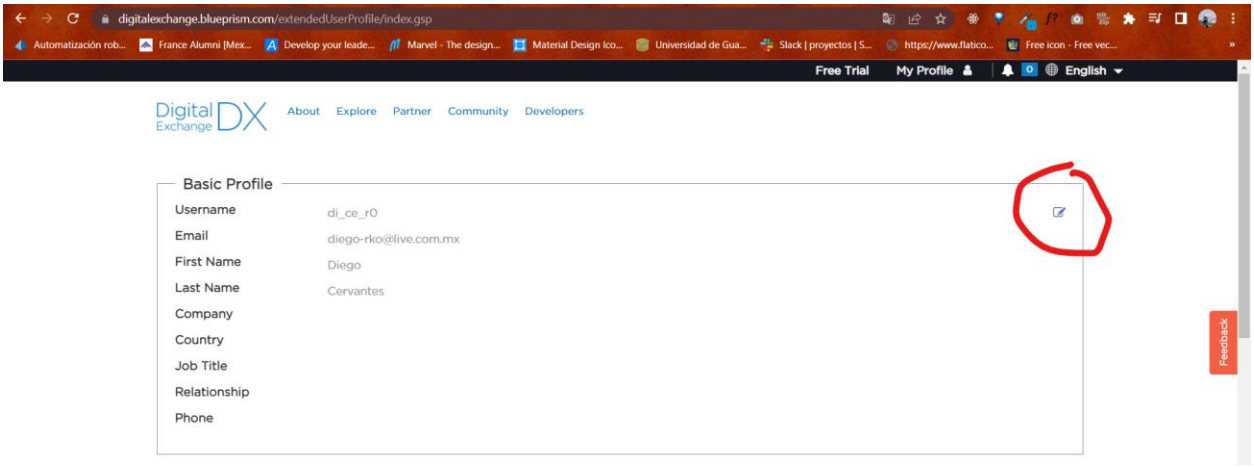


- Se vuelve a dar clic que sí a todo hasta que se termine la instalación, aquí se da clic en Close para terminar la instalación del servidor.

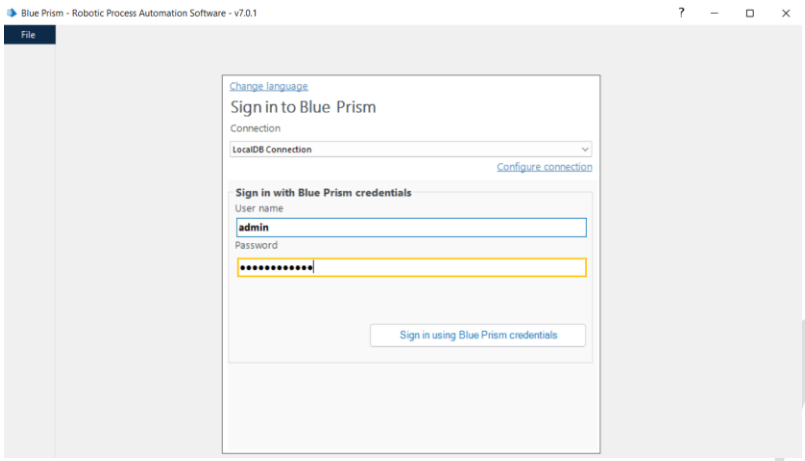


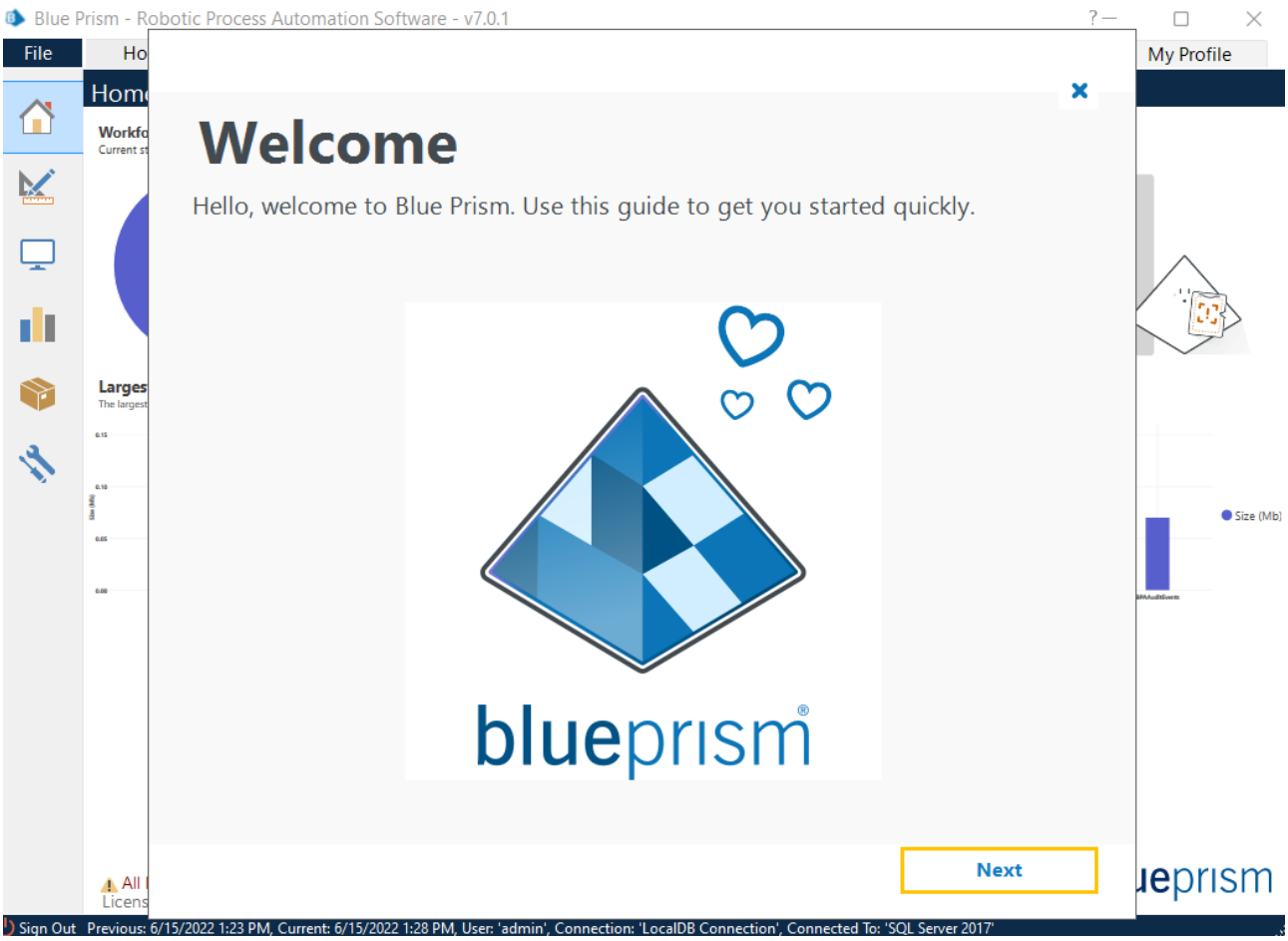
- Crear una cuenta de Blueprism XD para poder activar el software de Blueprism, ya teniendo la cuenta previamente creada en la página principal de Blueprism:





Ya que se descargue el programa, no se debe usar el nombre de usuario de la página de Blueprism, sino que se debe usar el usuario y contraseña admin, luego me saldrá una ventana donde se debe cambiar la contraseña, pero siempre que se quiera acceder al software se debe poner el usuario admin, esto porque es el usuario de la base de datos de Windows, no de Blueprism.





Blueprism

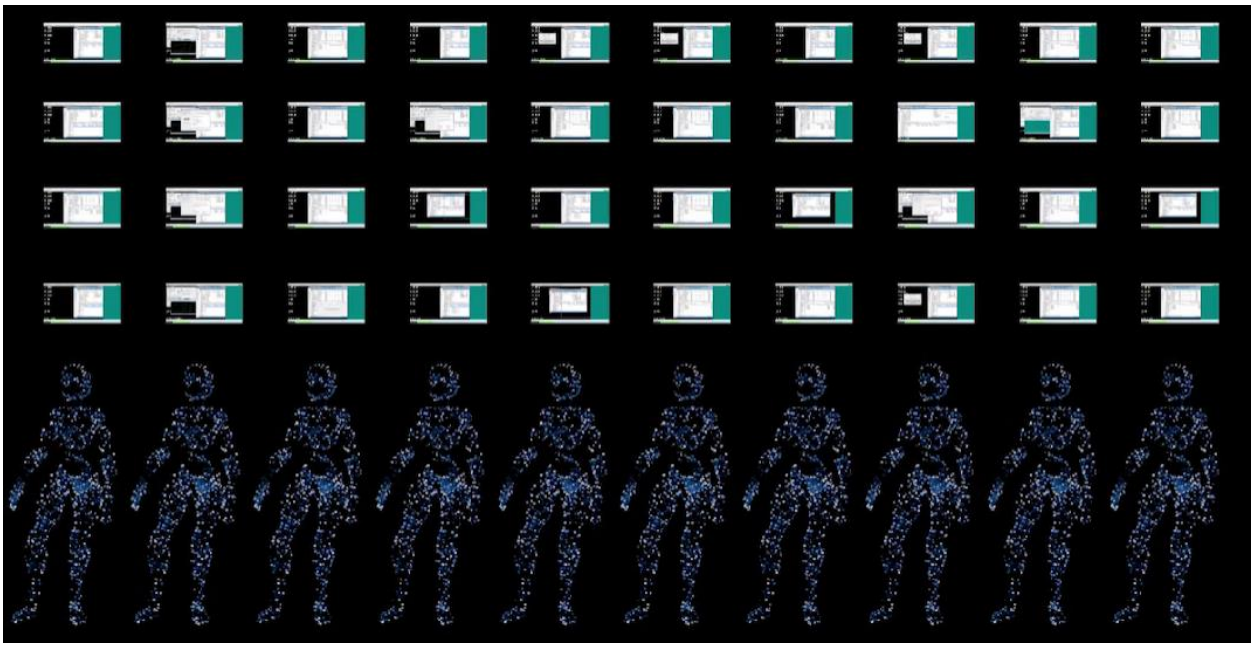
RPA: Blueprism es una plataforma de R.P.A. (Robot Process Automation) que sirve no para automatizar procesos industriales sino de servicios, como lo pueden ser las ventas, actividades administrativas repetitivas, etc. Este tipo de softwares se desarrolló para ser de fácil entendimiento sin la necesidad de ser manejado por un equipo de IT, por lo que se basa en un modelo de mapa de flujo, el programa no puede tomar decisiones, pero si puede seguir las reglas del negocio.

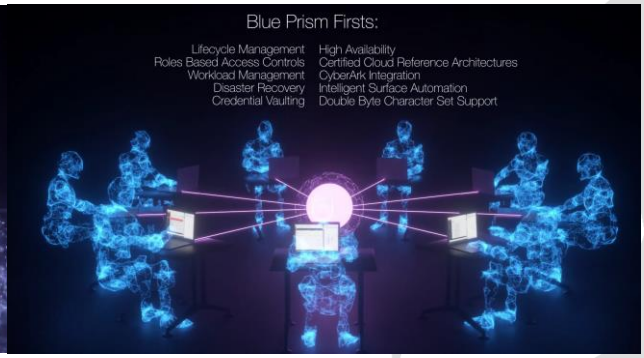
RDA: Su contraparte es el R.D.A. (Robotic Descktop Automation) que es simplemente un software que maneja datos de usuario, pero debe estar constantemente siendo monitoreado por un usuario, mientras que el R.P.A. maneja varias partes del proceso por sí solo.

Desarrollo de IT: La tercera opción de desarrollo de un software que lleve el negocio es uno personalizado creado por un equipo de desarrollo, el problema es que desde este punto el negocio dependerá de su equipo de IT para hacer el más mínimo cambio ya que no es de fácil uso para el usuario.

Ambos conceptos de R.P.A. y R.D.A. son definidos por la IEEE, teniendo como mayor diferencia que el R.P.A. está manejado por objetos, mientras que el R.D.A. está manejado por archivos, que deben ser reprogramados cada que hay un cambio en la estructura del negocio o una actualización.

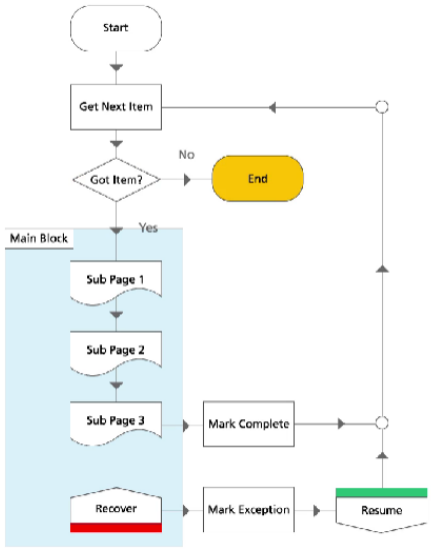
10 R.P.A. pueden substituir a 40 R.D.A. por lo que pueden ser fácilmente escalables.

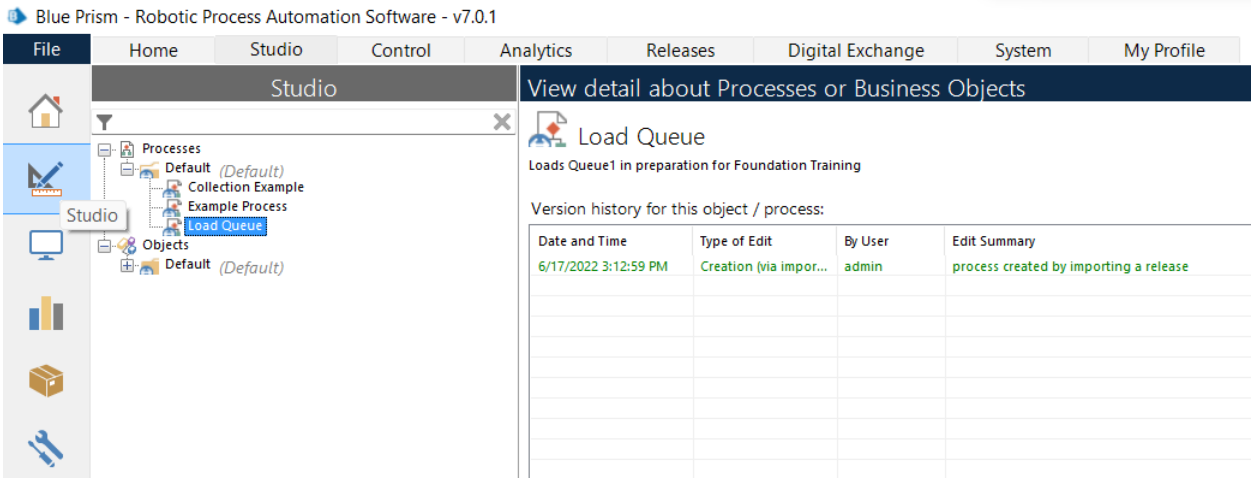




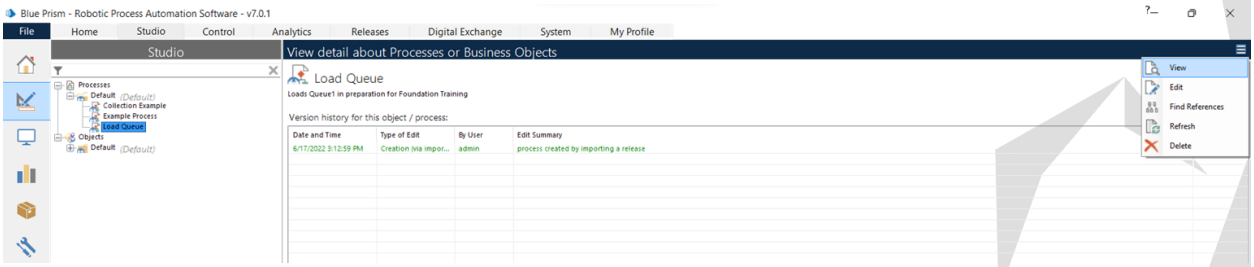
Partes de Blueprism:

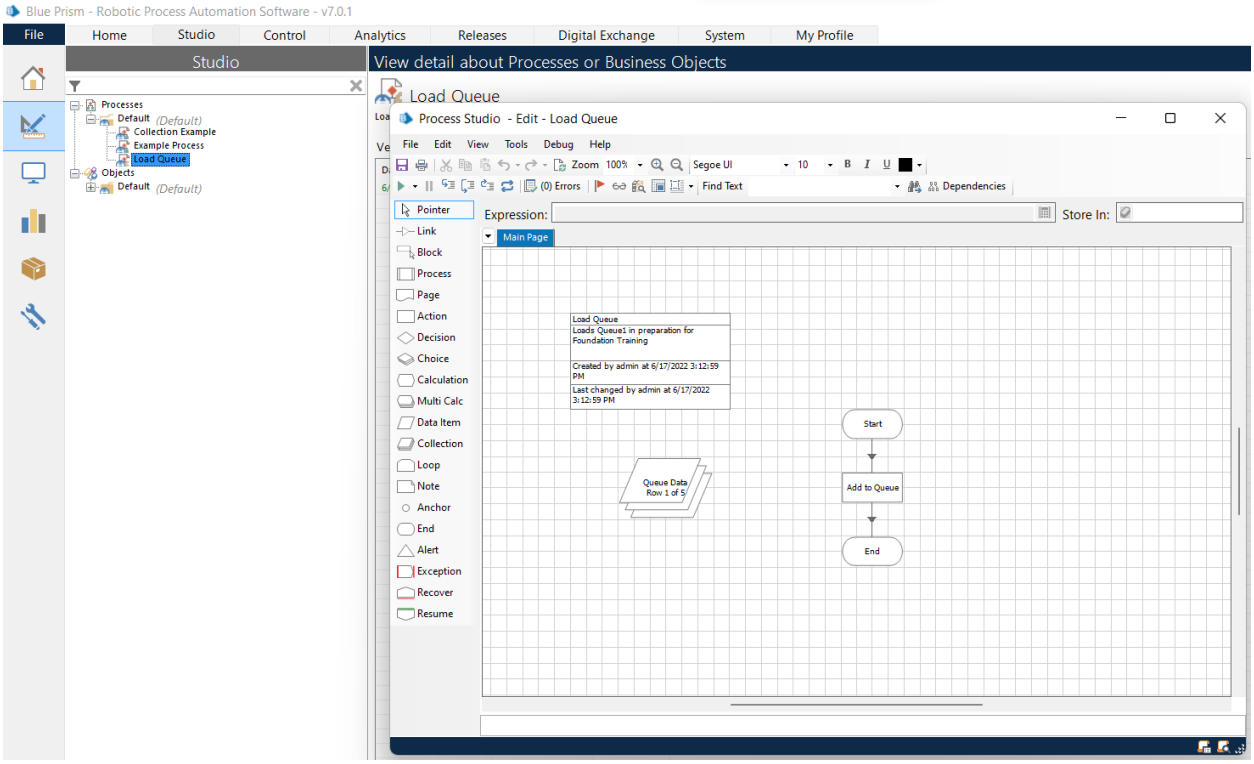
- **Object Studio:** Es una parte de Blueprism que sirve para crear el mapa de flujo con bloques de lo que debe realizar el robot. Cada proceso realizado puede ser asignado a uno o varios de los robots que se creen con Blueprism.





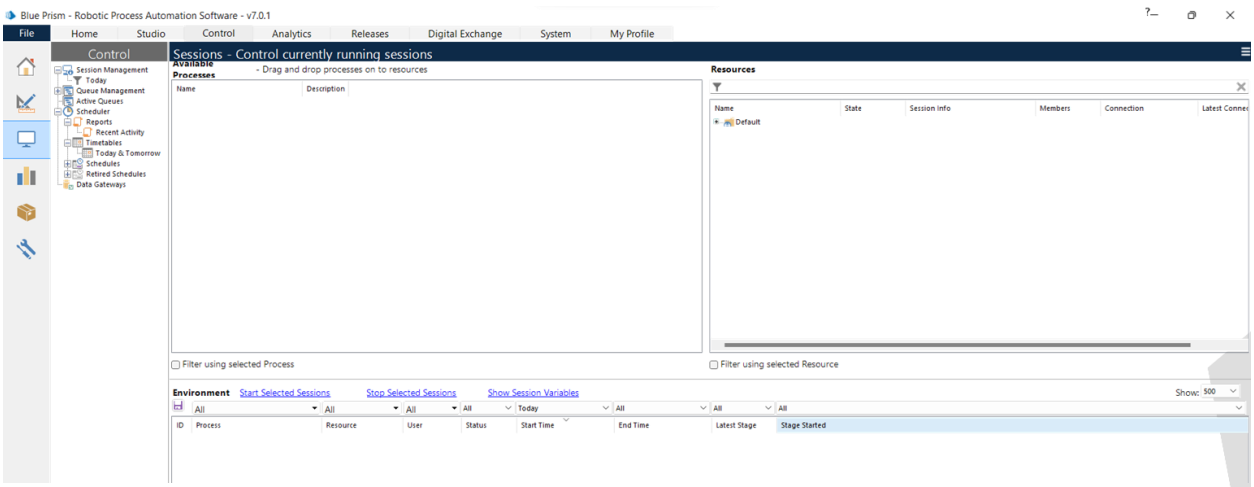
- **Process Studio:** Crea un flujo de trabajo para que el robot lo siga con bloques que se conectan con flechas para indicar el proceso que el robot debe seguir, se abre poniendo la opción de view primero en la esquina superior derecha y luego dando doble clic en Load Queue.





- **Excepciones:** Con ellas nos aseguramos de que el flujo de trabajo pueda hacer un manejo de excepciones.

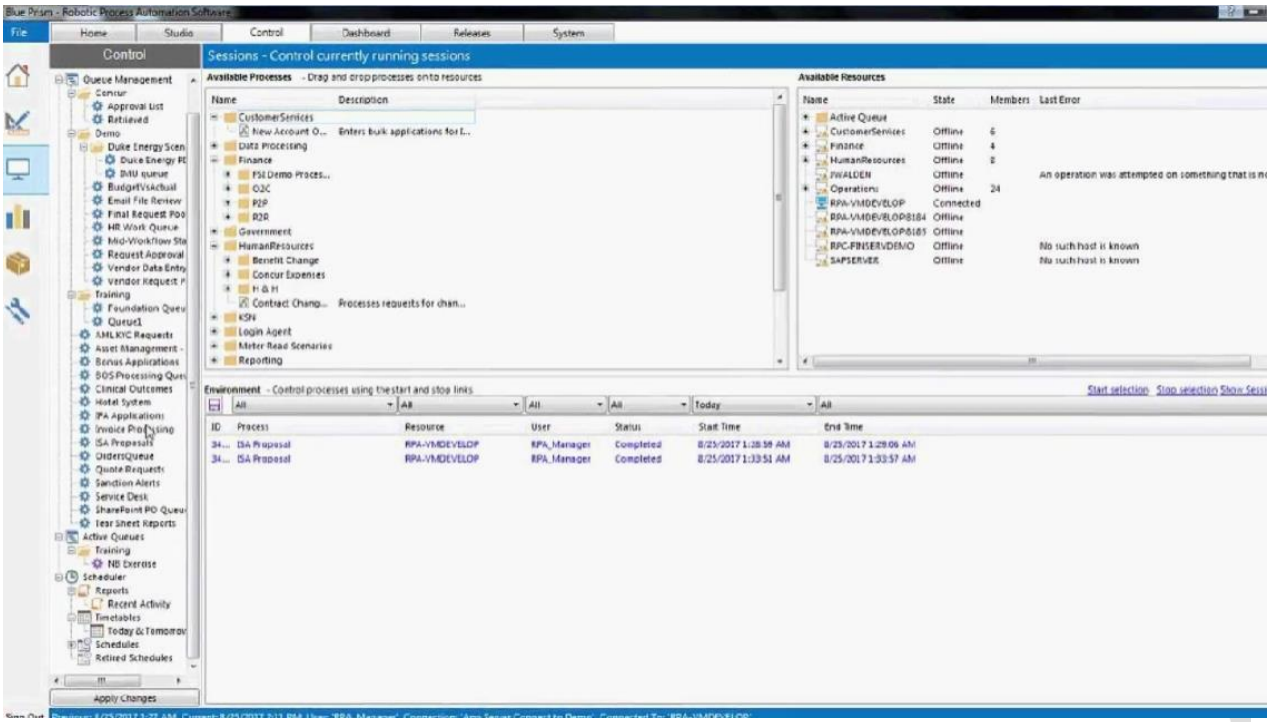
- **Control Room:** Usa una ventana llamada **Robotic Process Automation Software**, que es parte de Blueprism para encargarse de checar el rendimiento de cada robot cuya funcionalidad está descrita en el Object Studio. Además, puede servir para asignar distintos procesos a los robots en tiempo real si es que se necesita.



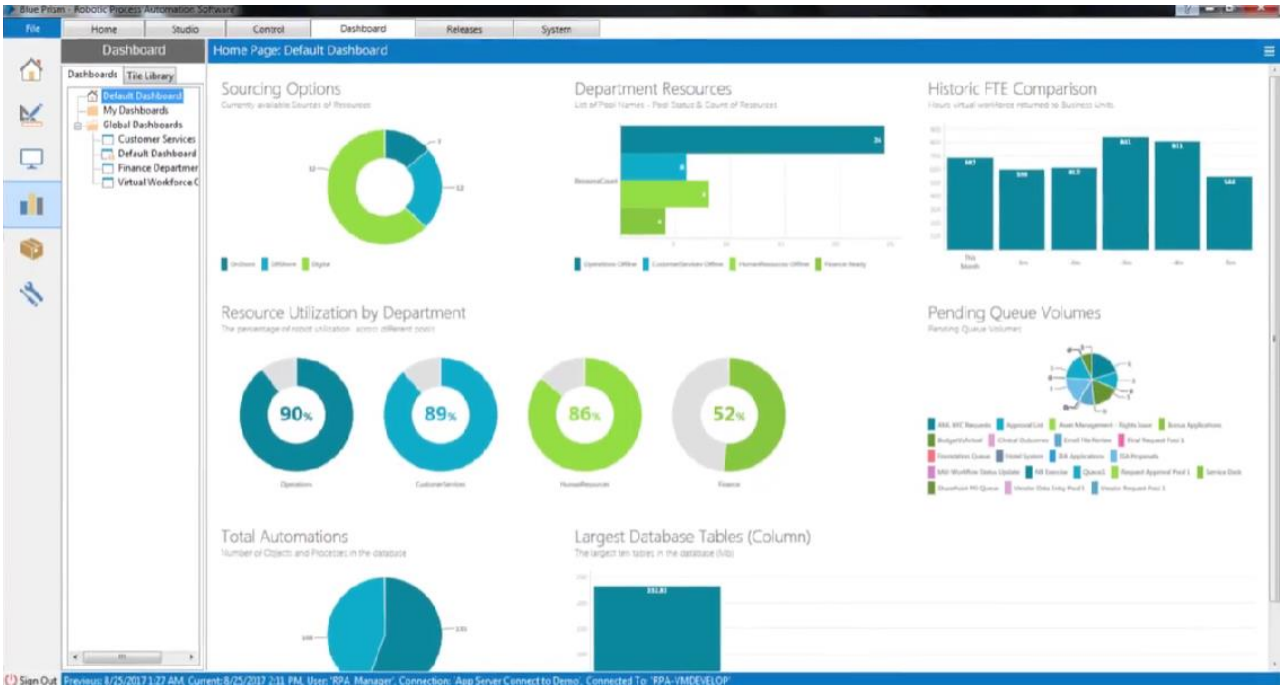
  - **Ques:** Son las banderas que indican el estado en el que se encuentra cada parte del proceso del robot, existen 4 tipos de banderas:
    - **Pending/deferred:** Items which are still to be worked have this state. The items are selected for working by the Get Next action in the order specified by the position of the item.

- If an item is deferred, it will not be selected for working until the deferral date/time is reached.
- These items can be marked with an exception, or a deferral date can be set on them.

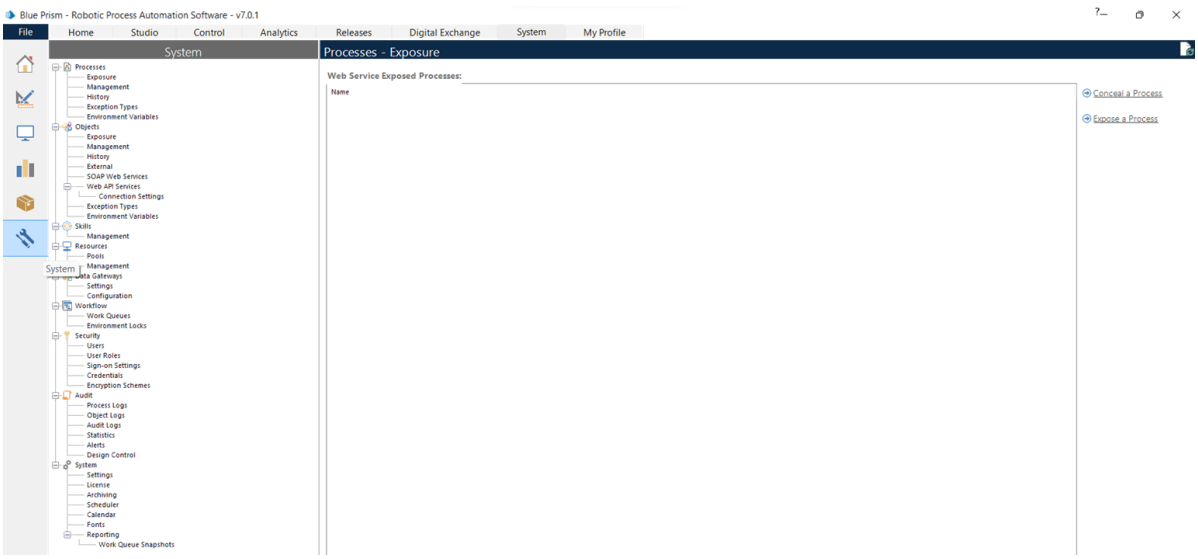
- **Locked:** Items which have been selected for work and are still being worked are in this state.
  - The locked state prevents them from being selected twice from the queue by more than one session.
  - Locked items can be unlocked within the list.
- **Completed:** Completed work items have been worked successfully to completion and they require no further attention.
  - Completed items can be deleted from the queue as required.
- **Exceptioned:** Exceptioned items have been selected for working, but have not been worked to completion. This may be due to a case being unsuitable for work by the process that worked it, or due to an error encountered in the session while working the case.
  - When an item is marked with an exception, it can be retried a number of items, if configured so in System Manager. Each attempt is represented by a separate line within the contents list.
  - Exceptioned items can be deleted or, if there are no pending or completed attempts, a new retry of the item can be forced.



- **Dashboard:** El rendimiento de los robots puede ser visto en forma de banderas que indican su estado para cada proceso que manejan o puede ser visto en forma de gráficas que muestran su rendimiento también.



- **System Manager:** Es la parte de Blueprism donde se indican las configuraciones de Blueprism.



Documentación oficial BluePrism

A continuación, se muestra una tabla donde se describe cada parte de Blueprism y para lo que sirve cada una de ellas.

Term	Definition
Application Modeller	*Application Modeller can be accessed via Object Studio. Using this tool, a Business Object can capture and identify Elements within the interface of an application, so that it can interact with the application. Application Modeller can be used to create a unique Attributes list for each of the Elements identified, to ensure they can be found and used by the Business Object.*
Control Room	*Control Room is where published Process Solutions can be assigned to Digital Workers to create Sessions. From here Sessions can be run and managed and Work Queues can be accessed, monitored, and managed. Schedules can also be initiated here, to restrict the processing of Sessions to specified dates and times.*
Object Studio	*Object Studio is where Business Objects are created, configured, edited and organized.*
Process Studio	*Process Studio is where Processes are created, configured, edited and organized.*
System Manager	*System Manager is where the settings for Blue Prism as a whole are accessed. Create and maintain user accounts, roles and permissions. View history or retire Processes or Business Objects. Manage Web Services. Create and administer Work Queues. Manage Licenses and general user interface settings.*
Release Manager	*Release Manager is where Packages are created and Releases are exported.*

Posteriormente se muestra una tabla con los demás términos utilizados para crear un proyecto de Blueprism.

Term	Definition
Process Automation	*Process Automation is the use of digital technology to perform the processing of workloads. Business processes can be fully automated, or partially automated with human intervention built in at strategic points.*
Blue Prism Solution	*A Blue Prism Solution is the term used to describe the end-to-end functionality of a Process. This includes the diagrams constructed in Process/Object Studio, the embedded Exception Handling logic, the Work Queue Configuration and the Packaging/Release of a Process.*
Manual Review	*When an Item is processed by a Work Queue and is flagged as an Exception, then it must be picked up by a person who will check and complete the processing manually.*
Process/Object Diagram	*A Process or Object Diagram is the visual representation of the Blue Prism computer program. Users can construct these diagrams from a selection of pre-configured components, to instruct Blue Prism to perform tasks.*
Process Flow	*When a Process is run, it will flow through the Process/Object Diagram following the hierarchy determined by the Page structure. The Process flow can be followed in Process/Object Studio as it highlights each Stage in yellow as it works through each task.*

Conceptos técnicos:

Term	Definition
Action	*Actions are the components of a Business Object. A Business Object is made up from a set of Pages known as Actions and each Action Page has its own logic diagram that performs a task, which is usually an interaction with an application. For example, an Action Page could be named 'Launch' and the logic within that Action Page could instruct an application to open.*
Attach	*When a Business Object needs to interact with an application that is already open and running on screen, then it can be configured to connect or 'Attach' to the application.*
Attributes	*Applications are made up of various Elements such as windows, fields and buttons. Each of these Elements are made up of various characteristics or 'Attributes' that combine to create a unique fingerprint. This enables the Element to be found and used by a Business Object.*
Business Exception	*An Exception raised due to rules based on data. For example, if an incorrect user-ID is passed to a Blue Prism Process or a loan amount applied for by a customer exceeds a specified limit.*
Business Object	*A Business Object provides a Process with the functionality to interact with an external application.*
Circular Paths	*A Circular Path enables a Process or Action Diagram to flow around certain Stages over and over again, until a specified limit is reached.*
Collection	*A Collection can store multiple values, stored in rows and columns in a table, similar to an Excel spreadsheet. Data in a Collection is accessed one row at a time and can be used for an Input and Output of data.*
Data Items	*Place holders for any values within Blue Prism, such as numbers, text, dates, etc.*

Digital Worker	*When a Process is published to Control Room it can be assigned to run on an external resource known as a Digital Worker, which carries out the processing of the workload.*
Element Tree	*The Elements that make up an Application Model, are organized in a hierarchy or 'Tree', which should be constructed to reflect the hierarchy of the application they model.*
Elements	*Applications are made up of various Elements such as windows, fields and buttons. These Elements can be captured by a Business Object and used to perform interactions.*

Evaluate Expression	*From within the Expression Editor Area of a Stage's properties window, the Evaluate Expression button can be used to check the result of an Expression, including what Data Type the Expression will produce.*
Exception	*Any errors that occur when a Process or a Business Object is run, are known as 'Exceptions'. These can be the result of a problem with the data that is being processed, a problem with how the Process is configured, or a problem with an application that is utilized by the Process.*
Exception Blocks	*When Exception Handling logic is configured into a Process or a Business Object, then 'Exception Blocks' can be used to isolate the area of the Process/ Object Diagram that a Recover Stage is responsible for. This makes it easier to identify and manage Exceptions.*
Exception Bubbling	*When an Exception occurs within a Business Object, then it will 'Bubble' up through the hierarchy of the Pages within the calling Process, until it reaches a Page that contains Recovery logic, at which point the Exception will be handled.*

Exception Handling	*Exception Handling is the logic that is used to cater for Exceptions, which can be built into both Processes and Business Objects.*
Exception Item Retries	*In System Manager a Work Queue can be configured to rework or 'Retry' Items that are marked as an Exception, by inserting a clone of the Item into the Work Queue as a new pending Item.*
Exception Management	*Procedures can be built into a Process Solution, to manage the errors that are identified during processing. This 'Exception Management' occurs within the Work Queue.*
Expression	*An Expression is a function that can calculate a value. The values used within an Expression can be of any Data Type and can either be written within the Expression, or obtained from a Data Item or a Collection Stage within the same Process.*
Flag	*A value that can be determined as either 'True' or 'False'. Decision Stages use Expressions to produce Flag outcomes.*
Function	*A function can be used as the operative part an Expression. Many functions require two or more parameters to define a relationship between them e.g. the Add function: (parameter) + (parameter). Some functions are operations on a single value, meaning they only require one parameter e.g. Trim("parameter(Text)"). And some functions are operations in themselves and do not require any parameters, e.g. NewLine().*
Global Data Item	*A Data Item that is universally accessible and can store values that can be accessed, updated and used by all of the Pages within a Process or Business Object.*
Globally Unique Identifier (GUID)	*When an Item is added to a Work Queue, it is assigned a unique ID consisting of a series of characters and numbers. This ID is stored within a Data Item when the Work Queue Item is brought into the Process.*

Input Parameter	*A value transmitted from an upper layer of a Process down to a lower layer, or from a Process to a Business Object Action. The Start Stage within a Sub-Page, Sub-Process, or Action can be configured to request an Input Value, which is provided by the Page Reference Stage, the Process Reference Stage or the Action Stage within the calling Process. The value provided by the calling Process or Process Page is then stored within a Data Item in the Sub-Process, the Sub-Page or the Business Object Action.*
Internal Exceptions	*If Exception Handling has not been built into a Process Solution, then any Exceptions that are the result of the way a Process is configured, or of the performance of an application that is used by a Process, will be categorized as 'Internal Exceptions'.*
Item Key	*An Item Key is a value that is used to identify an individual Item within a Work Queue. This value correlates to the Key Name configured in System Manager. It also correlates with the column within the Collection Stage that is used to store the data associated with the Item.*
Layering of Logic	*To ensure a Process is easy to manage and maintain, a Process Diagram should be broken down into specific tasks, which should be arranged on individual Pages within a layered hierarchy. The Master Page at the top, should determine the flow through the Sub-Pages.*
Local Data Items	*A Data Item that can only be accessed, used and updated by the Stages that sit on the same Page.*
Main Page / Sub-Page	*The Main Page is always at the top of a Process Solution, with Sub-Pages sitting underneath. There can be multiple Sub-Pages within a Process, but only one Main Page .*
Master Process / Sub-Process	*A Process can interact with and utilize the functionality of another Process, by using a Process Reference Stage. The calling Process is the Master Process and the Process being called is the Sub-Process.*
Multi-Object Design	*It is best practice to keep Business Objects as simple as possible. This can be achieved by using a separate Business Object to perform each interaction or small set of interactions, to carry out a simple task within an application. This approach is called 'Multi-Object Design'.*

Output Parameter	*An End Stage on a Sub-Page, Sub-Process or Action can be configured to use an Output Parameter to transmit a value up to a Page Reference Stage, a Process Reference Stage or an Action Stage on the calling Page or Process.*
Package	*A Package is essentially a list of all of the components that make up a Process Solution, e.g. Processes, Business Objects, Work Queues, Calendars, Schedules, Dashboards and Tiles.*

Postconditions	*Postconditions should describe the state of an application once an Action Stage has run, e.g. "the username and password fields of the application have had values entered into them."*
Preconditions	*Preconditions should describe the state of an application prior to an Action being run, e.g. "the application log in window is open on screen."*
Process Validation	*Process Validation checks a Process or Action Diagram for basic or potential errors. It provides feedback on any errors it identifies and provides the ability to highlight the exact Stages in which the errors have occurred.*
Recovery logic	*The logic that sits between the 'Recover' and 'Resume' Stages within a Process or Action Diagram, that is used to salvage, manage, retry and potentially move on from Exceptions.*

Recovery Mode	*The area of a Process or Action Diagram that sits between the Recover and Resume Stages.*
Release	*To export a Process Solution from Blue Prism a Release must be created, which is essentially a snapshot of a Package at a particular moment in time. A Release will have the file extension '.bprelease'.*
Re-Throwing Exceptions	*An Exception Stage can be used within Recovery Mode to 'Re-Throw' an Exception that has bubbled up. Preserving the information associated with the Exception - Exception Type and Exception Detail - and enabling the Exception to be handled in the Process layers that sit above.*
Session	*When a Published Process Solution is assigned to a Digital Worker or Resource in Control Room, a Session is created.*

Session Log	*When a Process runs it makes a record of each step it takes, this information is stored in the Session Log. The details of each Stage in the Process are recorded and errors are logged with the Stage Name, Stage Type and a description of the error that occurred.*
Spy Mode	*Spy Mode is a feature of Application Modeller that can be accessed via the 'Identify' button. Spy Mode enables the user to highlight the Elements within an application window and capture their Attributes, so they can be used by an Action to perform a task.*
Stage	*A Stage is a graphical representation of a command within a Blue Prism Process or Object Diagram. Stages are linked together to form the logical flow of a Process and can be configured to perform tasks, calculate values and determine the path down which a Process flows.*
Startup Parameter	*A Startup Parameter is a special type of Input Parameter, that is configured within the Start Stage on the Main Page of a Process. Upon running a Process or a Session, a Startup Parameter window will open to request an Input Value, which must be manually entered before the Process can run.*
Step Out	*The Step Out button enables the user to step out of the Process or Action Page that they are currently on, simultaneously executing the rest of the Stages on that Page and moving up to the layer above or out of the Process entirely.*
Step Over	*The Step Over button enables the user to jump past one Stage and onto the next, simultaneously executing the Stage that is being stepped over. An example of use, would be to Step Over a Page Reference Stage, which would cause the diagram on the Sub-Page to be executed in one go - without the need to step down into it and through every Stage on the Page.*
Stepping	*The Step button enables the user to step through a Process or Action Diagram, one Stage at a time.*
System Exception	*An Exception raised due to the behavior of an application, such as when a target application fails to launch or an Element can't be found on the screen.*
Throttle / Throttling	*By using a Wait Stage without any conditions at the beginning of an Action Diagram, the flow through the diagram can be 'Throttled', meaning the Process flow will pause for the duration specified in the Timeout. Throttles allow some extra time for an application to respond or for an interaction to complete before the flow continues, which can mitigate the variable performance speed of an application. Global Data Items are utilized for determining Timeout values.*

Throwing Exceptions	*An Exception Stage can be used within a Process or Action Diagram to 'Throw' an Exception if a Decision Stage or a Wait Stage produces an undesired or 'out of scope' outcome. To Throw an Exception means to embed some information into the Exception, then release it so it can bubble up to a Recover Stage on the same Page or on an upper Page, where it can be handled.*
Timeout	*Timeout is an essential part of the Wait Stage. The duration specified in the Timeout serves as a pause, to allow for specified conditions to be met within an application. The Timeout Stage is usually followed by an Exception Stage, but not always.*
Unconditional Wait	*An Unconditional Wait is a Wait Stage with no conditions applied, with the Timeout value used as a pause. Unconditional Waits are only used when there is an interaction between an Action and an application that does not result in a change in state in the interface of the application. Wait Stages with conditions are always preferable where possible.*
Validate	*Within the Expression Editor Area of a Stages properties window, users can click the Validate button to check whether the Expression they have constructed will result in the desired output and is therefore valid.*
Wait Condition	*A Condition within a Wait Stage usually checks that an application is in the correct state before an interaction and that a change in state has occurred following an interaction. A Wait Stage can have multiple conditions. Conditions appear as small circular nodes on the path between the Wait and Timeout Stages.*
Wildcard Symbol	*An Asterix (*) can be used as a 'Wildcard Symbol' when trying to locate something by its title. It can stand in for characters or blank spaces before or after the parts of the title that is known. For example, if you are looking for an application window and you know the window title has the words 'Log In' in them but you don't know what comes after, you can simply enter 'Log In*' which will return any results which include the words 'Log In' plus anything that may come after. There are other Wildcard symbols which have slightly different uses such as ?, !, -, #."*

Work Queue	*Data from external sources can be extracted by a Blue Prism Process and then stored as a list of workable Items within a Blue Prism Work Queue. A Work Queue is an internal configurable list that provides the functionality for thorough monitoring, sharing, logging and managing all of the data that needs to be processed by Blue Prism. A Work Queue is one of the fundamental components of a Blue Prism Solution.*
Environment	*An Environment includes its own database, application servers, virtual machines and Digital Workers.*
Operational Environment	*The Operational Environment is the live environment within a Business, where finished Blue Prism Solutions are implemented and set to work on live customer / business data. Before a Blue Prism Solution is released here, it should have been through a thorough cycle of development and UAT testing.*
UAT Environment	*The UAT Environment is a secure environment in which Process Solutions that have been configured by the Development Team can be tested. In here, live data can be worked by a Process in a controlled space that replicates the Operational Environment of the business. Thorough testing must be carried out here before the Solution is exposed to the real Operational Environment. During UAT testing, unexpected errors can be identified and then resolved by returning the Solution to the Development Environment for repair.*
Development Environment	*The Development Environment is a secure space in which Processes, Business Objects and Work Queues can be configured and tested by the Development Team - which is the first stage of Blue Prism Solution development.*

Certificación

El camino de las cosas que se deben aprender para poder realizar la certificación de Blueprism es la mostrada a continuación, además se puede encontrar en el siguiente link

https://blue-prism.docebosaas.com/pages/23/learning-plan:

Blue Prism® Developer Certification Path

Blue Prism® Developer Certification (EN-2021)

FREE

17 courses | 108h 55m

Learning Plan

Blue Prism® Associate Developer Certification Path

Blue Prism® Associate Developer (EN-2021)

FREE

8 courses | 45h 46m

Learning Plan

Process Controller

Blue Prism® Process Controller

FREE

10 courses | 7h 08m

Learning Plan

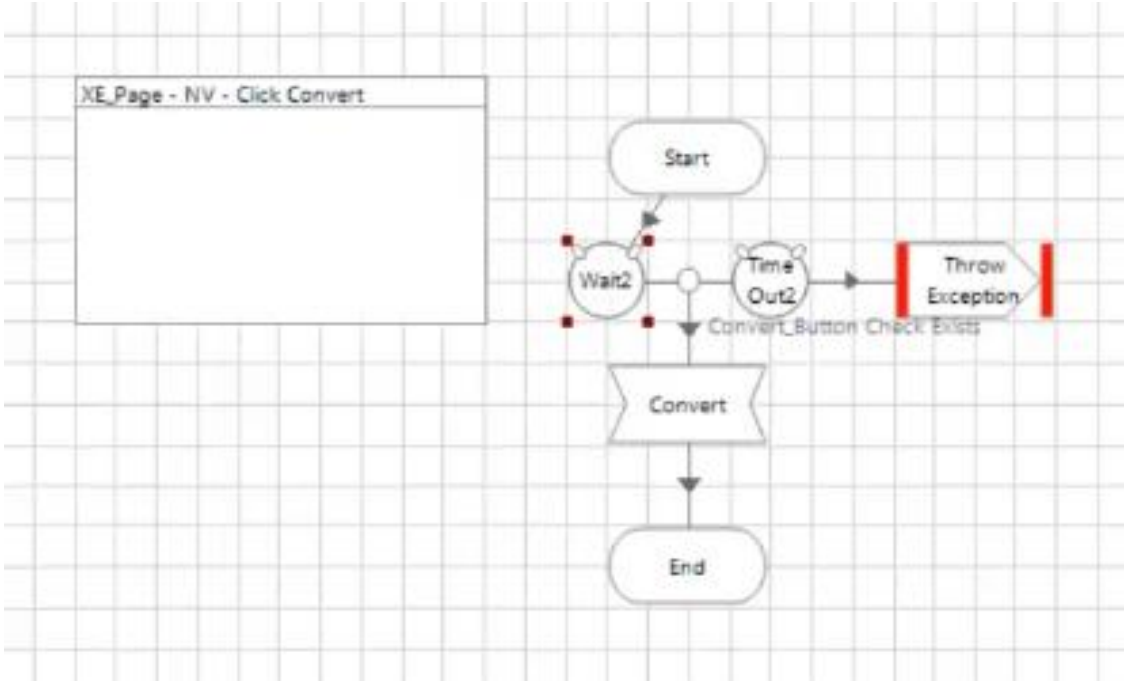
Blue Prism® Tiles and Dashboards

FREE

EN | 2h 00m

E-Learning

Wait al inicio de 1, 5 y 10 segundos, declarar varias variables de tiempos distintos en la página de Initialise para que sean globales, que dé una excepción con Throw exception

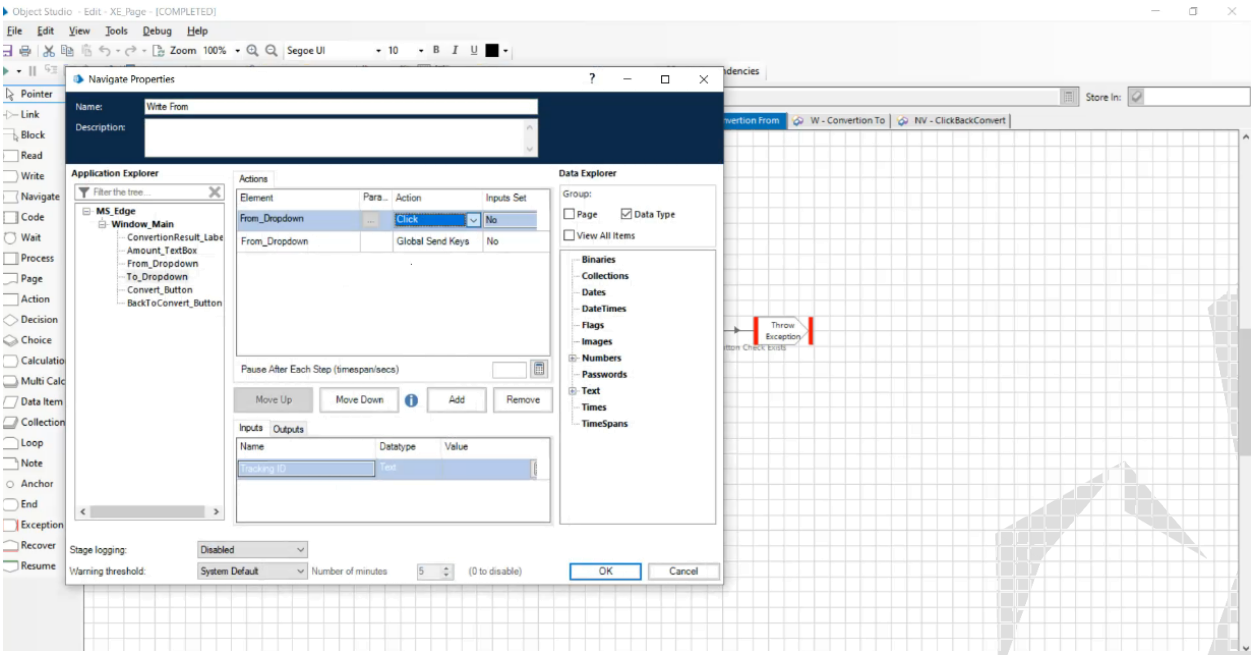


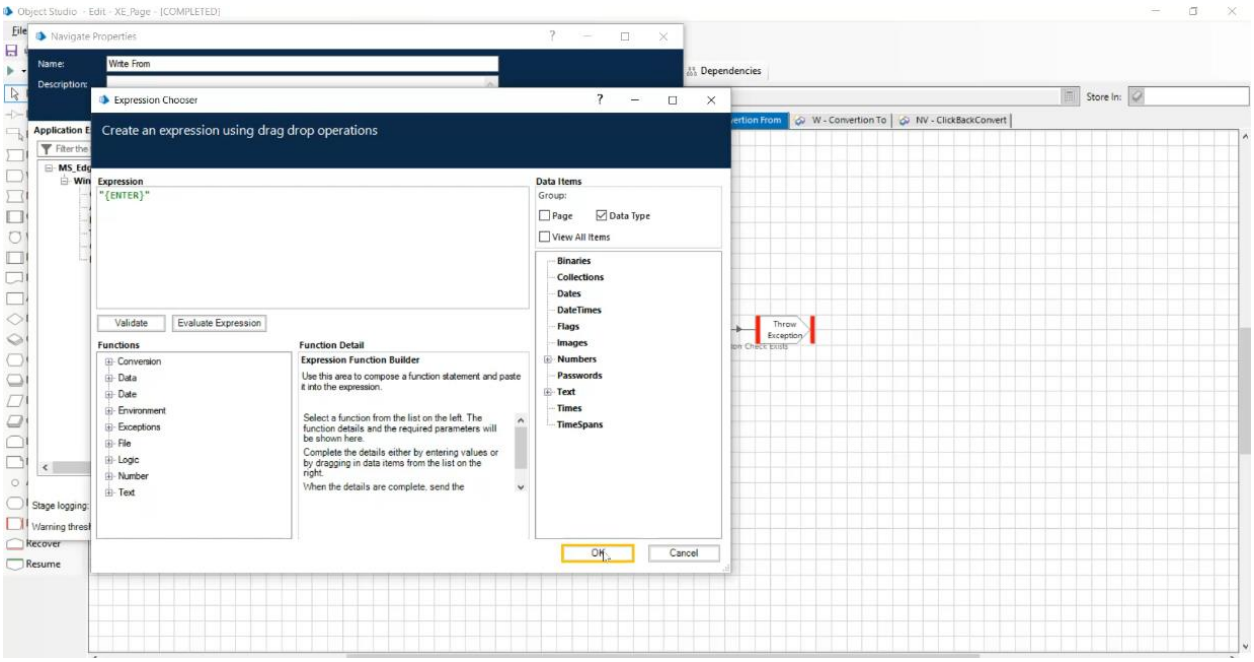
Se debe dividir en los más procesos posibles las funcionalidades del robot en Blueprism.

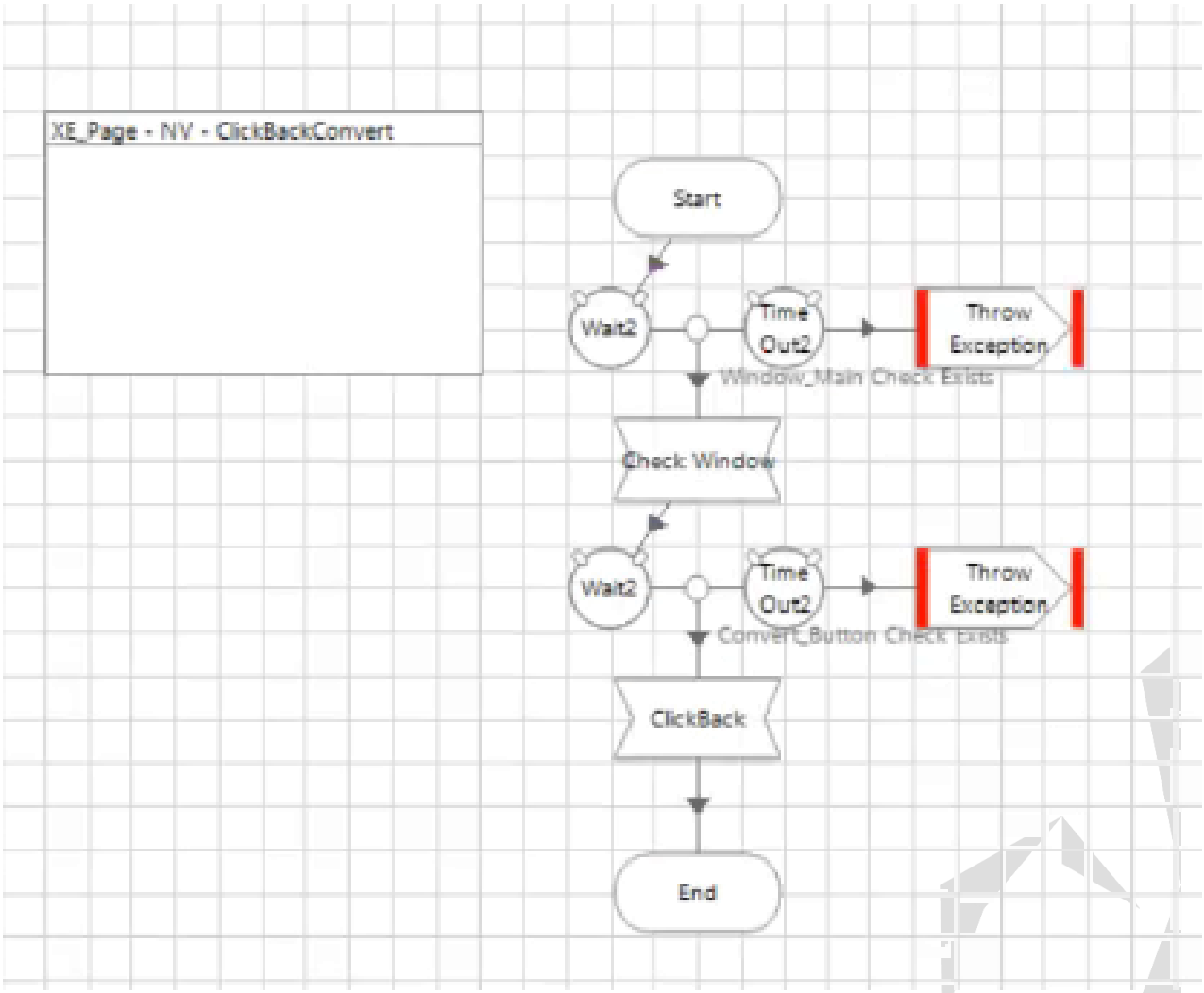
R(ead) – nombre

W(rite) – nombre

N(a)V(igate) – nombre




Navigate Properties
Name:
Write From
Description:
Dependencies
Store In:
Expression Chooser
Create an expression using drag drop operations
Expression
"{ENTER}"
Data Items
Group:
Page
Data Type
View All Items
Binaries
Collections
Dates
DateTimes
Flags
Images
Numbers
Passwords
Text
Times
TimeSpans
Validate
Evaluate Expression
Functions
Conversion
Data
Date
Environment
Exceptions
File
Logic
Number
Text
Function Detail
Expression Function Builder
Use this area to compose a function statement and paste it into the expression.
Select a function from the list on the left. The function details and the required parameters will be shown here.
Complete the details either by entering values or by dragging in data items from the list on the right.
When the details are complete, send the
OK
Cancel
W - Convertion To
NV - ClickBackConvert
Throw Exception
Stage logging:
Recover
Resume


XE_Page - NV - ClickBackConvert
Start
Wait2
Time Out2
Throw Exception
Window_Main Check Exists
Check Window
Wait2
Time Out2
Throw Exception
Convert_Button Check Exists
ClickBack
End

1.- Archivo de configuración: Es un Excel que tiene todos los paths y demás cosas para que de aquí se jale y utilice dentro del proceso de Blueprism, además de describir el tipo de excepciones de la Work Queue.

- Config.
- Tags.

Referencias:

SS&C BluePrism, “Recursos en RPA y automatización”, [Online], Available: https://www.blueprism.com/es/resources/